STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

12 August 1987

EXAMINER HEARING

IN THE MATTER OF:

Application of Conoco, Inc., for an unorthodox oil well location, McKinley County, New Mexico. CASE 9193

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Jeff Taylor
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin
Attorney at Law
KELLAHIN, KELLAHIN & AUBREY
P. O. Box 2265

I N D E X

E X H I B I T S

MR. STOGNER: Call next Case Number 9193.

MR. TAYLOR: Application of Conoco, Inc., for an unorthodox oil well location, McKinley County, New Mexico.

MR. STOGNER: Call for appearances.

MR. KELLAHIN: Tom Kellahin of Santa Fe, appearing on behalf of Conoco.

We are still putting together exhibits and would request that we delay this case for a few more minutes.

MR. STOGNER: Okay, we will do that.

(Thereupon other cases were heard and then Case 9193 was continued, as follows:)

MR. STOGNER: Okay, we'll go back to the Case Number 9193, which was previously called and Mr. Kellahin entered an appearance.

The witness may be sworn in.

(Witness sworn.)

MR. STOGNER: Mr. Kellahin.

NANCY HUDSON,

being called as a witness and being duly sworn upon her oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Ms. Hudson, would you please state your name?

A My name is Nancy Hudson.

Q And your last name is H-U-D-S-O-N.

A Yes.

Q Would you state by whom you're employed and in what capacity?

A I'm a landman for Conoco, Inc.

Q Have you previously testified before the Division?

A No, I haven't.

Q Would you describe your employment experience with Conoco as a petroleum landman?

A I began with Conoco in 1980/81 but didn't become a landman until 1982, and have worked the New Mexico area since 1985.

Q What is Conoco seeking to accomplish with

this application?

A We're seeking approval for an unorthodox location for our CSF Ruby Well No. 1.

Q What has been your involvement with the land matters for this particular well?

A I originally negotiated the agreement with Santa Fe Energy, who has the agreement with Cerrillos Land Company, who owns the oil and gas rights.

Q You're familiar with the ownership of the oil and gas minerals for this tract and for the adjoining 40-acre spacing tracts?

A Yes.

MR. EXAMINER, At this time we would tender Ms. Hudson as an expert petroleum landman.

MR. STOGNER: Ms. Hudson is so qualified.

Q Let me direct your attention to Exhibit Number One. Would you identify that exhibit for me?

A It's a Form C-102, Well Location and Acreage Dedication Plat.

Q And what does it show?

A The red outline shows the 40 acres we wish to be dedicated to the well and the dot is the unorthodox location.

Q What would be a standard location for an

oil well at this depth spaced on 40 acres?

A 330 from the entire quarter quarter line.

Q And what is the location for this well?

A It is 1720 from the west line and 1390 from the north line.

Q Do you know how close you are to the end of the boundary line on the north side of the unit?

A 70 feet.

Q Let me direct your attention to Exhibit Number Two and have you identify that.

A That is a PI POMCO land plat.

Q And what does it show?

A It shows the proposed location and two of the wells drilled in the section.

Q Let's look at Section 9 and the two wells in that section. What do you know about those wells?

A Neither one of them penetrated the Entrada formation.

Q Do you know whether or not there are any existing producing Entrada wells indicated on this map?

A No, there aren't.

Q This is a wildcat well drilled on statewide rules --

A The proposed --

Q -- except for the location?

A -- well?

Q Yes, ma'am.

A Yes, uh-huh.

Q Let's -- let's turn to Exhibit Number Three, now, Ms. Hudson, and would you again identify that exhibit?

A It's another POMCO PI land plat.

Q Okay, and what does this exhibit show?

A The blue outline shows all the offsettng acreage for the proposed 40-acre unit and the red outline shows the unit proposed to be dedicated to the well.

Q Who is the surface owner of the location where the well is to be drilled?

A Chaco Energy.

Q And who is in each instance the offset operator for the 40-acre spacing units around the proposed spacing unit?

A Cerrillos Land Company.

Q Let me turn to Exhibit Number Four now. Has Conoco taken the necessary steps to notify the offsetting operators or mineral owners of the proposed unorthodox location?

A Yes, we have.

Q And have you obtained a waiver from that individual or company?

A Yes, we have.

Q And what is Exhibit Number Four?

A Exhibit Number Four is a letter from Conoco to Cerrillos Land Company requesting they waive any objections to this unorthodox location.

MR. KELLAHIN: That concludes my examination of Ms. Hudson, Mr. Examiner. Our next witness is a geophysicist and he will talk to you about the specifics of the unorthodox location.

CROSS EXAMINATION

BY MR. STOGNER:

Q Ms. Hudson, I see that you sent the carbon copy of this off to Mr. Duke Roach with Santa Fe Energy?

A Yes. Santa Fe Energy and Cerrillos Land Company are both subsidiaries of Santa Fe Southern Pacific and Santa Fe Energy has an agreement with Cerrillos Land Company for the development of the oil and gas.

Q How deep is the well? You're going to have a geologist for a next witness?

MR. KELLAHIN: Yes, sir.

MR. STOGNER: Okay, I'll strike that question.

I have no further questions of Ms. Hudson. She may be excused.

Mr. Kellahin.

MR. TAYLOR: Has this witness been sworn?

MR. KELLAHIN: No, sir, would you do so for me?

(Witness sworn.)

MR. KELLAHIN: Mr. Kirkpatrick's exhibits are three. There's Exhibit Five, Six, and Seven. I'll make sure that you have them all.

JOHN M. KIRKPATRICK,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q All right, sir, Mr. Kirkpatrick, would you please state your name?

A John Michael Kirkpatrick.

Q And, Mr. Kirkpatrick, how are you employed and in what capacity?

A I am a geophysicist for Conoco, Incorporated.

Q Have you previously testified as geophysicist before the Division?

A No, I have not.

Q Would you describe for the Examiner what degrees you have and when and where you obtained them?

A I have a degree in geophysical engineering which I obtained in 1984.

Q From what --

A Bachelor of Science from Colorado School of Mines.

Q Subsequent to graduation, would you summarize your employment experience as a geophysicist?

A With Conoco I have been working with a geophysicist from -- with them since 1984. I have worked East Texas and New Mexico.

Q Have you made a geophysical study of the proposed unorthodox location that Conoco seeks from the Division in Case 9193?

A Yes, I have.

MR. KELLAHIN: We tender Mr. Kirkpatrick as an expert geophysicist.

MR. STOGNER: Mr. Kirkpatrick is so qualified.

Q Mr. Kirkpatrick, let me direct you to Exhibit Number Five and have you identify that exhibit for

us.

A Exhibit Number Five is an Entrada structure map over the prospect area. It is a time map that is contoured on the top of the Entrada, Jurassic Entrada interval.

Q Would you describe for us some of the geology that you have determined exists for this prospect within this section? I believe we're dealing with Section 16.

A Section 9.

Q Section 9. Describe in a general way for the Examiner the Entrada and the type of Entrada structure and production you're attempting to encounter in this section.

A The Entrada in this area is an Aolian sand. It's a thick sand and on top of that sand, which is a windblown deposited sand, is the Todilto Limestone. The Todilto Limestone is a lacustrine or fresh water limestone that was deposited from a fresh water lake that covers these dunes, sand dunes.

What we are particularly looking for in this area as a trap is the paleo dune in the Entrada and specifically what we look for is four criteria: One is structural closure on the Entrada. The second one is a thick Entrada section, which is showing us that we are on a

dune. The third one is a thin Todilto because while the Todilto was being deposited on top of these dunes, the dunes were paleo highs or structures of deposition, and so a thin Todilto section was deposited on the top while off to the sides there was a thick Todilto section.

MR. STOGNER: Okay. How do you spell Todilto?

A Todilto is spelled T-O-D-I-L-T-O.

Q What's your fourth criteria?

A And the fourth criterion is a seismic dimout, which is a result of the thinning Todilto section, which is a high velocity section, and so geophysical parameters.

Q Describe, if you will again, what you mean by the phrase "dimout".

A In a seismic section where you have peaks and troughs are the two main components of the trace which you are looking at, we look for a decrease in amplitude in the peak on a Todilto event on the seismic section.

Q Have you found a location in Section 9 that satisfies your four criteria for locating a well to penetrate the Entrada?

A On Exhibit five there is a red arrow which is pointing towards our preferred location, which is at -- located at shot point 80 of Line 372686.

Q Shot point 80 is going to be the line that runs from the northwest corner of Section 9 to the approximate southeast corner of 9?

A Correct.

Q On that line, then, have you located a location that meets your four criteria?

A Yes. On that line I have located a position that is where the red arrow is pointing on Exhibit Five.

Q Okay and that turns out to be the unorthodox location that Ms. Hudson described earlier.

A That is correct.

Q You've got a lot of information on the exhibit here, Mr. Kirkpatrick. Let me have you help me understand what you've shown.

In addition to shot line 80 there are several other seismic lines on the exhibit, are there not?

A Yes, there are.

Q Let's have you take a moment and describe the type of data that you have analyzed, the type of seismic data that you've analyzed in order to pick this location.

A All of the data on this map is modern CDP multifold high frequency data.

The two major lines crossing the prospect, which are Line 372686 and I believe the other one is

372686, are lines shot during 1986 by Conoco and they're multifold CDP data of high frequency.

Let's come back to this exhibit but I'd like to go and have you discuss Exhibits Six and Seven for us, and then we'll come back to Exhibit Number Five.

Let me direct your attention first of all to Exhibit Number Six, Mr. Kirkpatrick, and have you identify and describe this exhibit.

A This exhibit is taken out of an article from the AAPG Magazine, which is a prominent magazine in petroleum exploration.

It is an article about the Entrada sandstone in the San Juan Basin and is looking at the very similar trap as to what we are seeing at our proposed location for the Ruby Wells -- well.

Q Can you identify the number or the date of the bulletin or magazine?

A The bulletin was from December, 1981.

Q Within that article you have highlighted certain information. Would you discuss that for us and tell us the significance that you attribute to that information insofar as it regards your pick of this unorthodox location?

A The key points in this display is it's an ideal example of how a lack of data over one of the Entrada dunes could be very devastating in drilling a well because

being off the crest of the dune a very small distance could provide you with a dry hole versus a producer.

I've underlined two sections on the written material underneath the page. I'd like to read those.

The first sentence is, "That rapid variations in the topographic relief on the top of the Entrada highs in a curve was established at Eagle Mesa by the drilling of the 12-1-A Well, located only 225 feet north of the discovery well for the field."

If you'll look to the cross section which is Figure 20 on the top righthand side of the page you can see the producing well at Eagle Mesa Field, which is shown as the 12-1 Well and located directly to the left is the dry hole which is 225 feet to the north, the 12-1-A Well.

The second sentence reads, in the article, "Had this well" -- referring to the 12-1-A -- "rather than the original 12-1 Well been the first test drilled at Eagle Mesa, the field might never have been developed."

And as you can see from the cross section, that very small amount of difference caused the 12-1-A to be dry hole, which we are trying to avoid in our Ruby Wells prospect.

Q Let me direct your attention to Exhibit

Number Seven, which is the seismic display.

Let's take Exhibit Number Seven, and first of all have you simply identify this exhibit for me.

A This exhibit is Line 372686, which crosses the Ruby Wells prospect.

It is the northwest/southeast trending line which we looked at on Exhibit Five.

What this shows is the proposed location which is marked at shot point 80 on the seismic line.

Q How is it identified on the display?

A On my display it is an orange line with a dot at the top of it.

Q Okay. Running vertically on the display.

A Running vertically on the display.

Q This represents what you anticipate to encounter at this well location as you go through the Hospah, the Dakota, and finally into the Entrada?

A That is correct.

Q Would you identify now for us how you have shaded and identified the Hospah?

A The Hospah is shown in the brown color, which is a Cretaceous unit.

Q And the Dakota, how you have identified that?

A The Dakota is a Cretaceous formation and

is shown in orange.

Q Okay, and then finally, the Entrada.

A The Entrada is shown in yellow and it is a Jurassic age formation.

Q Let's take the Entrada and have you use this display and either starting on the far left or the far right, you pick the direction you'd like to go, and have you describe for us what's occurring as we go through the display in the Entrada interval.

A If you refer to the far right of the display you'll see two arrows, one pointing to the top of the Entrada and the second arrow pointing to the base of the Entrada.

These are the two arrows which we have tied in to synthetic control in the area as being the top and bottom of the Entrada formation.

As you follow the yellow color, which is signifying the Entrada sand, to the left, at roughly shot point 88 we see a thickening of the Entrada sand. This to us implies that we are moving onto a dune.

You'll also notice that the peak drift located directly above the yellow color is dimming out. Its amplitude is decreasing and that is a result of the thinning Todilto limestone and anhydrite over the Entrada dune.

So we have that peak directly above the

yellow as we go past -- it disappears right at about shot point 92. As we travel to the left again we start seeing a double peak in the yellow, a new peak appearing there, which is because we're going above the resolution of the seismic of the Entrada and we are now actually seeing the top of the sand and the bottom of the sand where before we were only seeing the bottom of the sand as a seismic event.

Again we have no Todilto peak and as we travel over to shot point in the area of 61, we start seeing the Todilto peak returning directly above the yellow coloring and we see the thinning of the Entrada as we travel to the northwest or left on this display.

Q Let's go back to your Exhibit Number Five. On Exhibit Number Five in the areas adjacent to the unorthodox location there are four black dots. What do those dots represent?

A Those four black dots are the standard drilling locations.

Q Let's go through each of those locations and have you describe for the Examiner how each one fails to satisfy your four criteria in determining the best location for drilling the Entrada well, and you can start wherever you like, just help us find where you start.

A I would like to use Exhibit Number Seven and Exhibit Number Five, the seismic line and the structure

map at the same time.

Q All right.

A To show you the locations on this map.

First of all, I would also like to state, one of the problems that we have in the Entrada is while we may have a structural closure, that does not mean the dune is sitting on top of the structure. The dune can be off to the side. It can be in a low. The dune can be any place on that structure. So that's in the four criteria, identifying where the dune is in relationship to the structure. So you do not always want to be exactly on the top of the structure. You want to be on the highest point of the structure and also in the dune.

Looking at the four locations, if we move to the location directly north of the red arrow, or our proposed location, so it would be the northeast standard location, that projects into seismic line 372686 at approximately shot point 75.

The problem with that location is, number one, it is off the seismic line so we have no structural control, and number two, we are down dip from our proposed location.

If we move to the northwest standard location, again we are off of any control points or off of the seismic line, and we are also down dip from our proposed lo-

cation.

If we move to the location directly south of our proposed location, or the southeast standard location, that projects into the seismic line at approximately shot point 83 and that one is approaching the edge of the dune. We feel that that one, although it's in a favorable structural position, referring to the cross section that I showed you earlier, it may possibly be off of the Entrada paleo dune and is not in as preferable location as show point 80.

Going to the standard location to the north -- excuse me, southwest of the proposed location, that would -- is on a different seismic line but again it is off of the Entrada dune anomaly.

And so the only location that puts all four of our criterion -- satisfies all four of our criteria, is our proposed location.

Q Were Exhibits Five and Seven prepared by you or compiled under your direction and supervision?

A Yes, they were. I checked them over.

Q To the best of your knowledge they're accurate and correct?

A Yes.

MR. KELLAHIN: That concludes my examination of Mr. Kirkpatrick. We would move the intro-

duction of Conoco Exhibits One through Seven.

MR. STOGNER: Exhibits One through Seven will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Kirkpatrick, whenever I refer to Exhibit Number Seven, so I can sort of get a depth idea, what is -- what are we talking about the depth of the Entrada and the base of the Entrada? About what depth are we talking about?

A I am estimating that the top of the Entrada will be encountered at 4150 feet.

Q So none of the wells -- what are the -- is there any wells around this area that are in that peak?

A The closest well that penetrates the Entrada is approximately 7 miles to the northwest.

Q Okay, now was that an oil test or a uranium test?

A That was an oil test.

Q Okay, how about any uranium test?

A Not that I am aware of.

Q I'd like to refer to Exhibit Number Six and the picture of the cross section in Figure 20 on that page up in the upper righthand corner. Is that the kind of

anomaly in which you're describing here with your Exhibit Five and Seven today?

A It's a similar type anomaly, yes, sir.

Q Okay.

A One problem which shows on that cross section in locating your first location, is the tilted oil-water contact in the Entrada.

We originally thought that we could go in and find out what the tilted oil/water contacts were in the six producing fields in the area and use that an additional criteria for locating our well, but as it turned out, the oil/water contacts were all tilting in different directions in each field. There was no one preferred direction to that oil/water contact.

Q What does that kind of tell you about the dunes?

A It doesn't really tell you anything about the dune. What's controlling that is the waterflow through the Entrada. It's telling you the water is not all flowing in one direction in the Entrada.

Q Okay.

MR. STOGNER: Well, I have no further questions of this witness.

Is there anything further in

Case Number 9193 at this time?

MR. KELLAHIN: No, sir.

MR. STOGNER: If nobody else has anything further in this case, this case will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9193, heard by me on 13 August 1987.

Michael E. Stogner, Examiner
Oil Conservation Division